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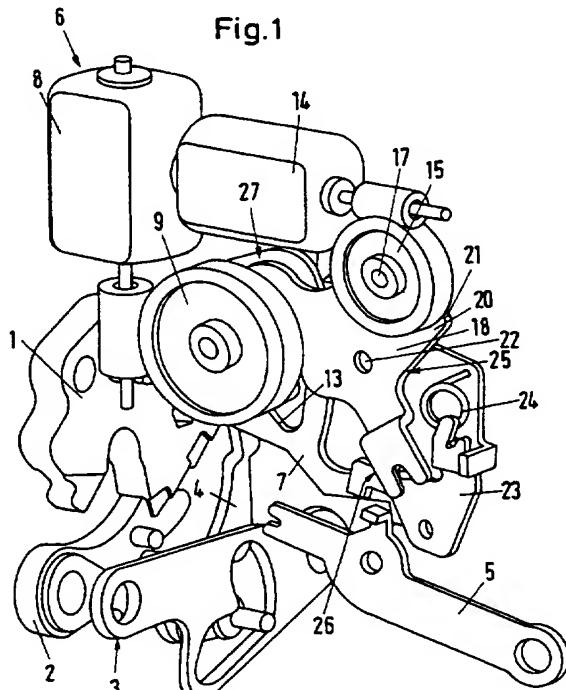
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## (54) Central locking system with theft protection system

(57) A motor vehicle door lock has a central locking system comprising a reversible central locking drive 6 powered by an electric motor 8 and a central locking element 7 connected to a locking lever system. A central locking control pin 10 impinges on stop faces 13 of the central locking element 7 to control motor 8. A reversible theft protection electric motor 14 acts on a driven element 15 comprising two mutually opposite theft protection control pins (16, Fig 2). A theft protection main lever 18 is acted on by the control pins (16) and comprises a forked receiver 19 having two fork arms 20 and theft protection stop faces 21. The theft protection main lever 18 can swivel in relation to the central locking element 7 and is mounted on the same bearing pin 22. When the theft protection of the centrally locked motor vehicle door lock is switched off, an interior locking lever 5 is positively coupled to the central locking element 7, but when switched on the interior locking lever 5 is free from the central locking element 7.



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Fig. 1

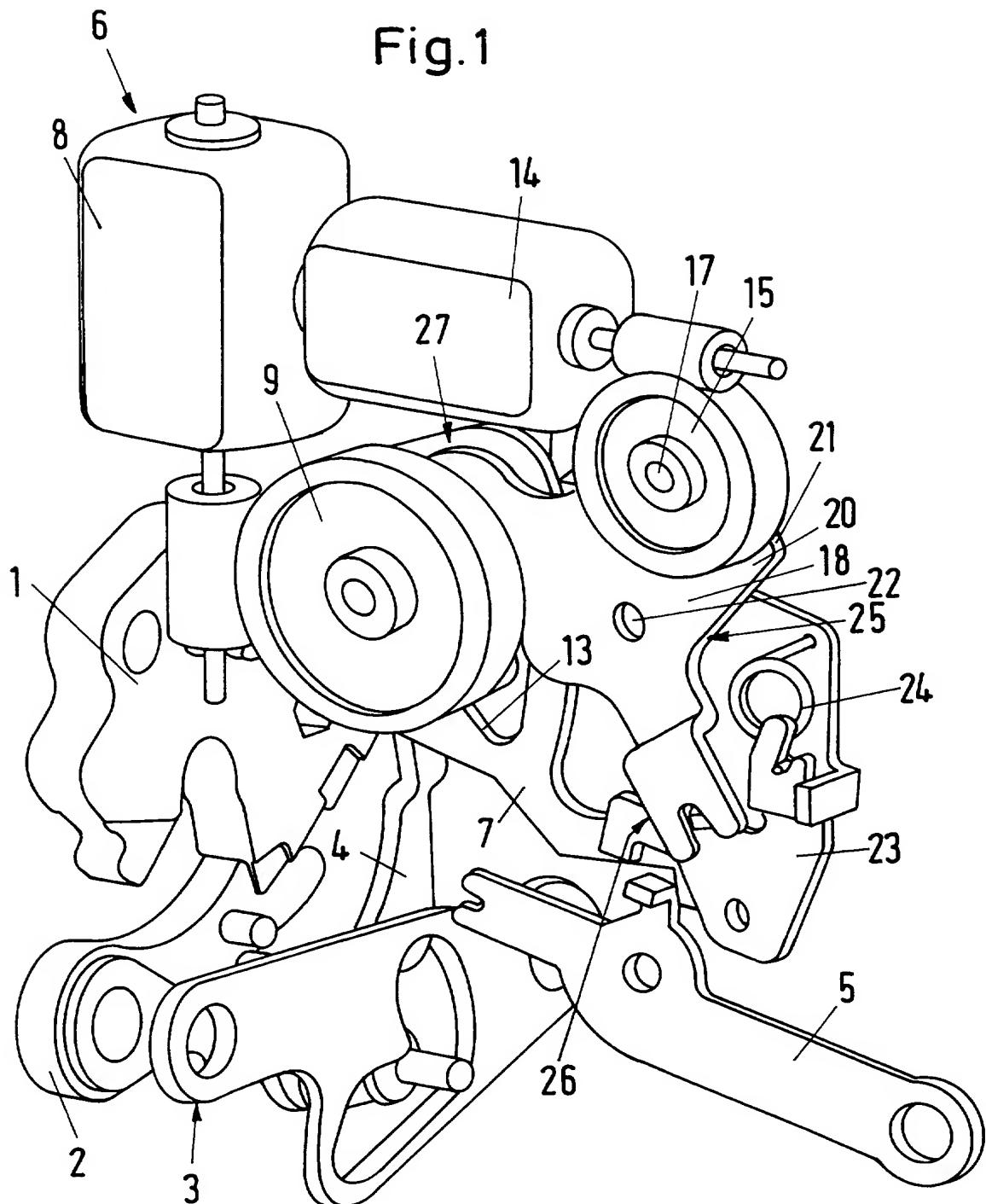


Fig. 2

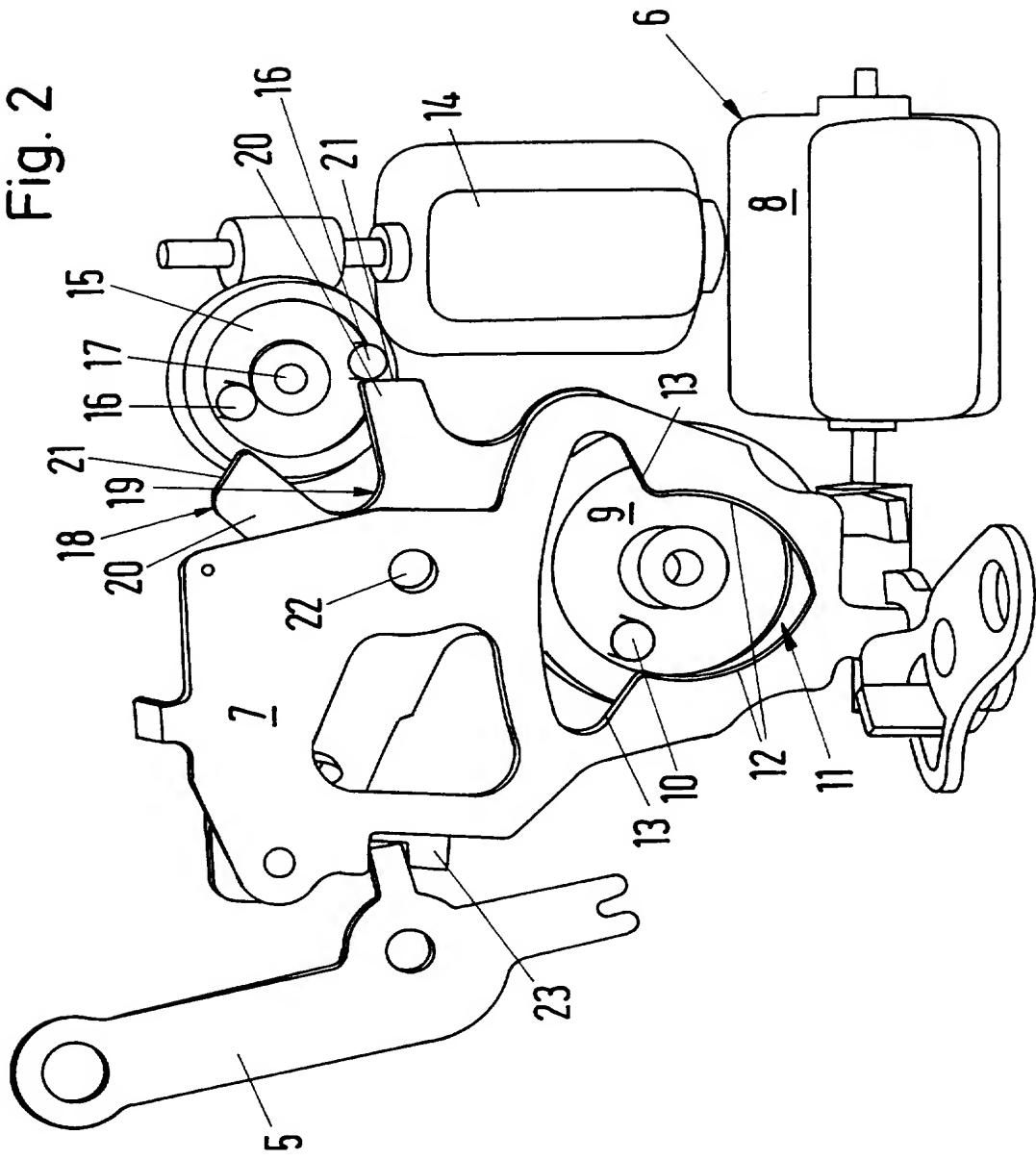
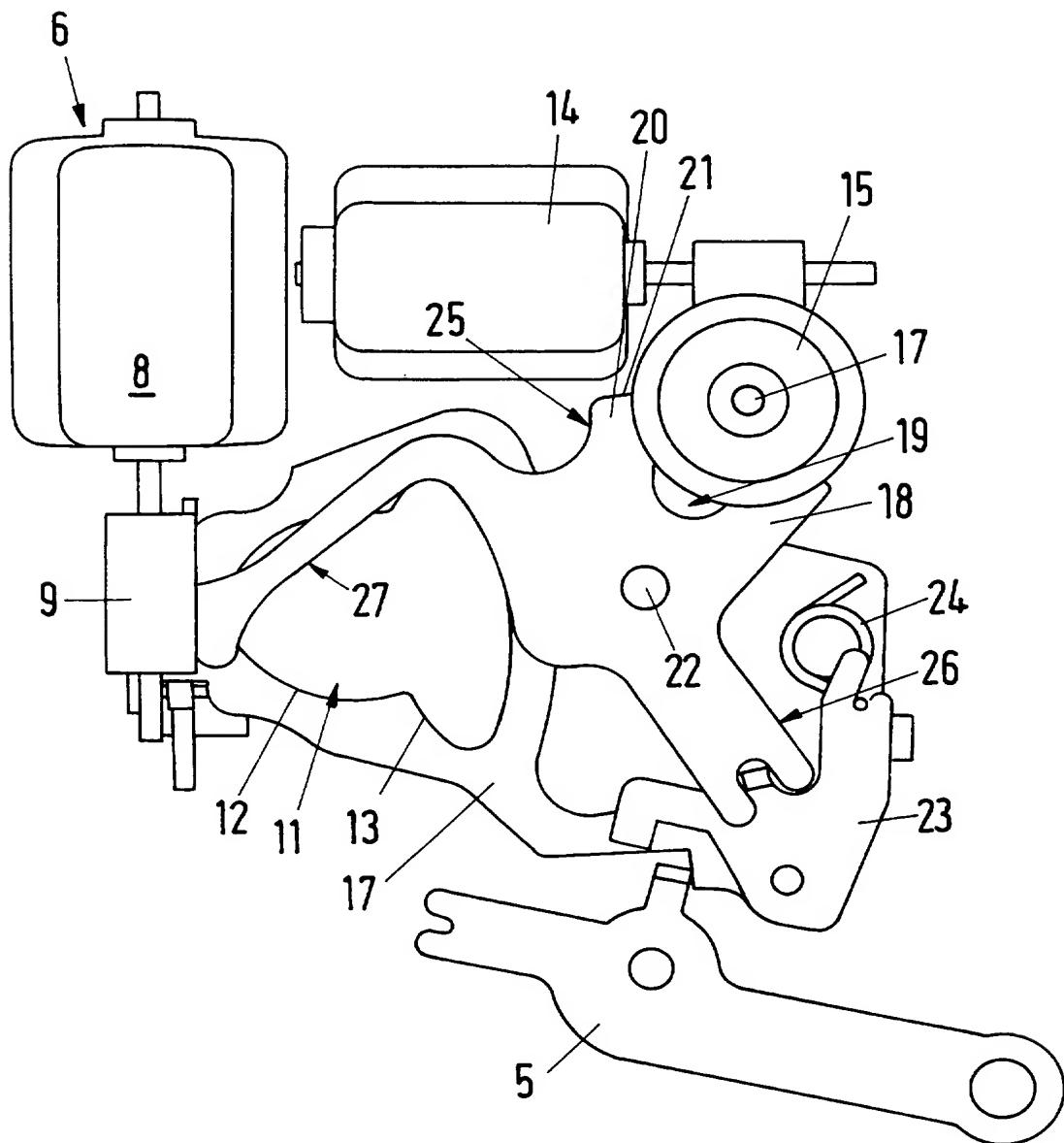


Fig. 3



**A motor vehicle door lock having a central locking system and a theft protection system**

This invention relates to a motor vehicle door lock having a rotary latch, a pawl and a release lever, having an operating lever system which acts on the release lever and which comprises at least one interior operating lever, having a locking lever system which comprises at least one interior locking lever, and having a central locking system comprising a central locking drive and comprising a central locking element connected to the locking lever system, wherein the central locking drive is designed as a reversible drive which is equipped with a central locking electric motor and which comprises a driven element having at least one eccentric central locking control pin, and wherein the central locking control pin can be directed to execute counter-clockwise and clockwise control movements on an arc of rotation whereby the central locking element is moved into the "unlocked" and "locked" operating positions, wherein the central locking element comprises a forked receiver having central locking control faces which are disposed at the sides in the forked receiver and which are associated with the central locking control pin, and the interior locking lever and the central locking element are connected to each other, wherein part of the arc of rotation of the central locking control pin is situated outside the forked receiver of the central locking element and the central locking element comprises a central locking stop face for the central locking control pin on each of its two sides near the forked receiver, and wherein the control movements of the central locking control pin are limited in each case by the central locking control pin impinging on one of the stop faces, wherein the central locking electric motor can be switched off with the impingement of the central locking control pin on the stop faces. - It should be understood that the motor vehicle door lock is provided with a controller which is necessary for its electric motor-actuated operation and comprises corresponding control switches and sensors and the like.

Motor vehicle door locks of the construction described at the outset are known (DE 44 45 043 A1). They are characterised by their simplicity of manufacture and installation and have been proven in practice. One advantage is that the electric motor merely has to be sized according to the operating forces of the locking lever system. Manual unlocking and locking is made possible at the same time, wherein it is likewise essentially merely the operating forces of the locking lever system which have to be overcome. A theft protection system is not provided with these motor vehicle door locks, however.

In principle, it is known that a motor vehicle door lock of the type described at the outset can be provided in addition with a theft protection system (DE 195 33 199.0 A1, German Patent Law Section 3 (2)). For this purpose, the arrangement is designed so that the locking central lever and the coupling lever are non-positively connected to each other by a coupling spring with respect to a movement from the "locked" operating position into the "unlocked" operating position, wherein the coupling lever comprises a theft protection element. The central locking control pin can thereby be directed into a "theft-protected" operating position, in which the central locking control pin locks the coupling lever in its "locked" operating position via the theft protection element. The central locking electric motor also acts on the theft protection system here. For this purpose an electric motor is necessary which can be directed very accurately into its various positions, and a multiplicity of corresponding control switches is also necessary. This is costly.

A basic object of the present invention is to provide a motor vehicle door lock of the construction described at the outset, which comprises a theft protection system which is simple as regards drive technology and control technology.

According to the present invention, there is provided a motor vehicle door lock having a rotary latch, a pawl and a release lever, having an operating lever system which acts on the release lever and which comprises at least one interior operating lever, having a locking lever system which comprises at least one interior locking lever, and having a central locking system comprising a central locking drive and comprising a central locking element connected to the locking lever system,

5 wherein the central locking drive is designed as a reversible drive which is equipped with a central locking electric motor and which comprises a driven element having at least one eccentric central locking control pin, and wherein the central locking control pin can be directed to execute counter-clockwise and clockwise control movements on an arc of rotation whereby the central locking element is moved into the "unlocked" and "locked" operating positions,

10 wherein the central locking element comprises a forked receiver having central locking control faces which are disposed at the sides in the forked receiver and which are associated with the central locking control pin, and the interior locking lever and the central locking element are connected to each other,

15 wherein part of the arc of rotation of the central locking control pin is situated outside the forked receiver of the central locking element and the central locking element comprises a central locking stop face for the central locking control pin on each of its two sides near the forked receiver, and

wherein the control movements of the central locking control pin are limited in each case by the central locking control pin impinging on one of the stop faces, wherein the central locking electric motor can be switched off with the impingement of the central locking control pin on the stop faces, characterised in that

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a theft protection system having a reversible theft protection electric motor is provided in addition, which electric motor acts on a driven element comprising two mutually opposite theft protection control pins, and

10 that a theft protection main lever is associated with the theft protection control pin, which theft protection main lever comprises a forked receiver having two fork arms and theft protection stop faces constructed thereon, and can swivel in relation to the central locking element and is mounted with the latter on the same bearing pin, and

15 that a coupling lever is provided between the theft protection main lever and the central locking element,

wherein when the theft protection of the centrally locked motor vehicle door lock is switched off the interior locking lever is positively coupled to the central locking element and when the theft 20 protection of the centrally locked motor vehicle door lock is switched on the interior locking lever is free from the central locking element

It should be understood that emergency unlocking can also be effected without difficulty by means of a mechanical key and a closing cylinder. For this purpose, the theft protection main

lever may comprise three arms, as it were, the first of which is for the theft protection power take-off, the second of which is for a positive connection with a theft protection auxiliary lever, and the third arm of which is for the connection to the closing cylinder for emergency unlocking.

The advantages achieved are manifested in that both the central locking electric motor  
5 and the theft protection electric motor are stopped by a jamming movement. This is simple and operationally reliable. In this respect, special switches can be dispensed with. It is not necessary to employ electric motors which can be controlled very accurately as regards their positions. Consequently, very simple electric motors can be used, which are inexpensive and are particularly suitable for a motor vehicle door lock which constitutes a product made by industrial  
10 mass production.

The invention is described in more detail below with reference to the drawings, which merely illustrate an example of an embodiment, and where:

Figure 1 is a schematic perspective illustration of a portion of a motor vehicle door lock according to the invention;  
15 Figure 2 shows the functional relationship between components of the subject of Figure 1 when rotated by 90°; and  
Figure 3 shows Figure 2 as viewed from the back.

The motor vehicle door lock illustrated in the Figures is equipped, as usual, with a rotary latch 1, a pawl 2 and a release lever 3. An operating lever system acts on the release lever 3 and comprises at least one interior operating lever 4. In addition, a locking lever system is provided which comprises at least one interior locking lever 5. Moreover, the motor vehicle door lock is equipped with a central locking system. The latter comprises a central locking drive 6 and a central locking element 7 connected to the locking system. The central locking drive 6 is

designed as a reversible drive which is equipped with a central locking electric motor 8 or a central locking electric geared motor. It comprises a driven element 9 having at least one eccentric central locking control pin 10. The central locking control pin 10 executes counter-clockwise and clockwise control movements on an arc of rotation. The central locking element 5 7 can thereby be directed into the "unlocked" and "locked" operating positions.

The central locking element 7 comprises a forked receiver 11 having central locking control faces 12 which are disposed at the sides in the forked receiver 11. These central locking control faces are associated with the central locking control pin 10. The interior locking system and the central locking system are connected to each other. Part of the arc of rotation of the 10 central locking control pin 10 is situated outside the forked receiver 11 of the central locking element 7. The central locking element 7 is provided, on both sides near the forked receiver 11, with a central locking stop face 13 for the central locking control pin 10. The arrangement is designed so that the control movements of the central locking control pin 10 are limited in each 15 case by the central locking control pin 10 impinging on one of the stop faces 13, wherein the central locking electric motor 8 can be switched off with the impingement of the central locking control pin 10 on the central locking control faces 12.

It can be seen in particular from a comparative examination of Figures 2 and 3 that a theft protection system having a reversible theft protection electric motor 14 is provided in addition. The theft protection electric motor 14 acts on a driven element 15 comprising two mutually 20 opposite theft protection control pins 16, which driven element 15 rotates about an axis 17. The arrangement is designed so that a theft protection main lever 18 is associated with the theft protection control pin 16, which theft protection main lever comprises a forked receiver 19 having two fork arms 20 and theft protection stop faces 21 constructed thereon. Moreover, the

theft protection main lever 18 can swivel in relation to the central locking element 7 and is mounted with the latter on the same bearing pin 22. A coupling lever 23 which performs the function described at the outset is provided between the theft protection main lever 18 and the central locking element 7.

5 It can be seen from Figure 2 that when the theft protection of the centrally locked motor vehicle door lock is switched off the interior locking lever 5 is positively coupled to the central locking element 7. It can be seen from Figure 1 that when the theft protection of the centrally locked motor vehicle door lock is switched on the interior locking lever 5 is free from the central locking element 7. Both the central locking electric motor 8 and the theft protection electric motor 14 are stopped by the jamming movement which occurs when the theft protection control pin 16 and the central locking control pin 10 move against the stop faces 21 and 13, respectively. 10 Special switches can be dispensed with in this connection. The motors 8 and 14, respectively, do not have to set accurate positions. Relatively small and inexpensive electric motors can therefore be employed, which is advantageous for industrial mass production. The theft protection electric motor 14 only has to move, via its transmission, the theft protection main 15 lever 18 and the coupling lever 23 whilst overcoming the tilt spring 24. The central locking electric motor 8 has to move the central locking element 7, the coupling lever 23, and the interior locking lever 5 to which the connecting rod and the interior locking operating rod are attached, wherein as a rule this operating rod is guided at several points in the motor vehicle door and the 20 operating button of this operating rod is likewise mounted, so that only slight frictional forces have to be overcome. It can be seen from the Figures that it is also possible without difficulty to effect emergency unlocking with a mechanical key or via a closing cylinder. For this purpose, the theft protection main lever 18 is equipped with three arms, as it were, namely a first arm 25

for the engagement of the theft protection driven element 15, a second arm 26 for the positive connection with the coupling lever 23, and a third arm 27 for the connection to the closing cylinder for emergency unlocking.

**Claim**

1. A motor vehicle door lock having a rotary latch, a pawl and a release lever, having an operating lever system which acts on the release lever and which comprises at least one interior operating lever, having a locking lever system which comprises at least one interior locking lever, and having a central locking system comprising a central locking drive and comprising a central locking element connected to the locking lever system,

wherein the central locking drive is designed as a reversible drive which is equipped with a central locking electric motor and which comprises a driven element having at least one eccentric central locking control pin, and wherein the central locking control pin can be directed to execute counter-clockwise and clockwise control movements on an arc of rotation whereby the central locking element is moved into the "unlocked" and "locked" operating positions,

wherein the central locking element comprises a forked receiver having central locking control faces which are disposed at the sides in the forked receiver and which are associated with the central locking control pin, and the interior locking lever and the central locking element are connected to each other,

wherein part of the arc of rotation of the central locking control pin is situated outside the forked receiver of the central locking element and the central locking element comprises a central locking stop face for the central locking control pin on each of its two sides near the forked receiver, and

wherein the control movements of the central locking control pin are limited in each case by the central locking control pin impinging on one of the stop faces, wherein the central locking electric motor can be switched off with the impingement of the central locking control pin on the stop faces, characterised in that

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a theft protection system having a reversible theft protection electric motor is provided in addition, which electric motor acts on a driven element comprising two mutually opposite theft protection control pins, and

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that a theft protection main lever is associated with the theft protection control pin, which theft protection main lever comprises a forked receiver having two fork arms and theft protection stop faces constructed thereon, and can swivel in relation to the central locking element and is mounted with the latter on the same bearing pin, and

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that a coupling lever is provided between the theft protection main lever and the central locking element,

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wherein when the theft protection of the centrally locked motor vehicle door lock is switched off the interior locking lever is positively coupled to the central locking element and when the theft protection of the centrally locked motor vehicle door lock is switched on the interior locking lever is free from the central locking element.

2. A motor vehicle door lock substantially as hereinbefore described with reference to the accompanying drawings.



The  
Patent  
Office

II

**Application No:** GB 9716547.6  
**Claims searched:** 1 and 2

**Examiner:** Robert H Games  
**Date of search:** 8 October 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E2A (AARN, AMXF)

Int Cl (Ed.6): E05B 47/00

Other:

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2292768 A (KIEKERT) see whole document	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.